

We claim:

1. A head mounted projection display (HMPD) comprising:
  - 5 an Artificial Reality Center (ARC) display component having a greater than about 70 degrees field of retroreflection integrated with an optical tiling display which provides a greater than about 80 degrees Field of View (FOV) per eye, whereby an overall binocular horizontal field of view greater than about 80 degrees is realized.
- 10 2. The HMPD of claim 1 wherein the tilting display provides a greater than approximately 70 degree horizontal FOV.
- 15 3. The HMPD of claim 1 wherein the tiling display provides a greater than 50 degree vertical FOV.
4. The HMPD of claim 1 whereby an overall binocular horizontal FOV is greater than about 120 degree is realized.
5. The HMPD of claim 1 having a compact lens, preferably, a Fresnel lens when the ARC display is closely attached.
- 20 6. The display of Claim 1 having a resolution of about 2 arc minutes for the about 120 degree binocular FOV, and as small as about 1 arc minute for a slightly reduced FOV.
- 25 7. A method of providing a wide field of view (FOV) to a head mounted display comprising the steps of:

(a) combining an Artificial Reality Center (ARC) display component and an optical tiling display; and,

(b) integrating said component and said tiling display whereby an overall binocular field of view (FOV) greater than about 80 degrees is realized.

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8. The method of claim 7 whereby an overall binocular FOV greater than about 120 degrees is realized.

9. The method of claim 7 wherein the optical tiling display is subjected 10 to an aft-projection folding.

10. The method of claim 7 wherein the combing step also includes a compact lens when the distance between the ARC display component and said optical tiling display is smaller than 150 mm.

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11. The method of claim 10 wherein said compact lens is a Fresnel lens.

12. A wide field of view (FOV) head mounted projection display (HMPD) system comprising an artificial reality center (ARC) display made 20 of retroreflective material located at least approximately  $\frac{1}{2}$  meter apart from the viewer in the environment.

13. The method of claim 12 wherein said ARC display is made of retroreflective material to form a curved screen to cover the wide FOV.

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14. The method of claim 12 wherein said ARC display is remotely located to allow the viewer to see both the environment and the virtual 3D objects projected by the optics of the HMPD.
- 5 15. A wide field of view (FOV) head mounted projection display (HMPD) system comprising an artificial reality center (ARC) display made of retroreflective material attached closely within mm to a head of a viewer.
- 10 16. The method of claim 15 wherein said ARC display is made of retroreflective material to form a curved screen to cover the wide FOV.
17. The method of claim 15 wherein said ARC display is attached closely within approximately 100 mm to the viewer.
- 15 18. The method of claim 15 whereby a compact lens is employed to image the projected image to the ARC display.
19. The method of claim 18 wherein the compact lens is a Fresnel lens.
- 20 20. The method of claim 15 wherein said ARC display is attached closely within mm to the HMPD to allow the viewer to see virtual 3D objects projected by the HMPD and form an immersive head mounted display.